

# INFLUENCE OF TAYLORISM ON DEMING'S QUALITY MANAGEMENT<sup>1</sup>

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## ABSTRACT

Frederic W. Taylor's principles of management is considered as the foundation of the modern management. Taylorism has been influential both in private and public sectors in many parts of the world. To increase efficiency and productivity Taylor scientifically studied the each element of work and discovered the best way of doing any task; scientifically selected and trained workers so that they could be hired for jobs that they were capable of; and closely monitored and evaluated the performance of workers through close supervision and a strict reward system. Many theories have been put forward to design more productive work environments since Taylorism. One of them is W. Edwards Deming's quality management developed in Japan. Like Taylor's ideas, quality management has spread to the world. Quality management also referred as Total Quality Management involves developing quality standards to eliminate inefficiency and increase customer satisfaction through Deming's 14 principles. The paper discusses the similarities and differences in both theory based on the writings of Taylor and Deming. Results indicate that despite of some similarities, it is hard to describe Deming's quality approach as another form of Neo-Taylorism or a form of democratic Taylorism. Moreover, governing values of each system is critically different.

**Keywords:** Taylorism, Scientific Management, Quality Management.

## 1. INTRODUCTION

Quality management approach has harsh criticism from some authors as being a new edition of classical Tayloristic approach (Boje and Winsor, 1993; Tompkins, 2005). According to the critics, employee empowerment through the quality teams or circles are just illusion hiding the truth of re-rationalization of production processes through central planning and standardizations. According to this view employees feel empowered so that they turned to be the instruments of planned change from the top.

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The application of quality management may create conflicting results in different work-settings. However, this paper focusses on the comparison of both theorists approach based on their books, *Principles of Scientific Management* by Frederic W. Taylor and *Out of Crisis* by W. Edwards Deming. The findings indicate similarities as well as major differences between two different approaches.

## 2. TAYLORISM

### 2.1. Rise of Taylorism

Taylorism also known as scientific management is a breakthrough in management since it is the first modern management theory. Despite this statement, we are also aware of essays on management much before the introduction of Taylorism. Socrates, the ancient Greek philosopher defended *generic management* in 450s BC (Shafritz et al.,2011). There were also pieces that mentioned an important elements of Taylorism such as division of labor and task specialization, before Taylorism. The founder of Economics, Adam Smith in 1776 as well as Charles Babbage in 1832 wrote on division of labor and task specialization for improving productivity (Shafritz et al.,2011; Thompkins, 2005).

It is also a fact that many great civilizations and states such as Persian, Roman, Arab-Islamic, Ottoman, Roman, Chinese, and British could not be achieved without management and organization of people, resources, and armies. Moreover, the emergence of industrialization in late 1760 shifted the center of production process from agrarian and handicraft business to factories with machinery (Encyclopedia Britannica, 2016). The new production process required bringing many employees under one roof and getting them working effectively, efficiently, and productively. As a result, when Taylor was just a worker, *machine shop laborer*, in Midvale Steel Works in 1878, the industrial revolution and the factory system was about 120 years old.

From the machine shop laborer, he rapidly promoted to managerial positions and finally became the chief *engineer of works* in the Midvale Steel Works; therefore he learned about the success and failures of machine productions system. What Taylor did was actually creating a management system that boosted effectiveness, efficiency and productivity. He benefited from the past experience and used some methods or techniques, and developed many new ones based on the science. His difference was the development of new management doctrine, a management system. His success was amazing in the sense that his system increased the productivity as much as 300 to 400 percent.

## 2.2. Changing Roles for Workers and Managers

As opposed to some harsh criticism against Taylorism, Taylor attempted to maximize the benefits of both workers and factory owners and achieve workplace peace (Taylor, 2007). Taylor in his book “*Principles of Scientific Management*” rejected the traditional work practices in which workers decided the volume and method of doing any task. According to the traditional system, it was workers who decide the amount of output therefore the profitability of the firm. The traditional system resulted in soldiering of workers and significantly limited the effectiveness, efficiency, and productivity.

Taylor Suggested new roles for the managers and workers as follows (Taylor, 2007):

- Scientific analysis of the tasks of any job
- Scientific selection, training, and development of workers
- Close cooperation between managers and workers for the implementation of scientific principles regarding the work to be done
- A fair distribution of work load between workers and managers through new roles defined by Taylorism.

As we see from the principles above, Taylorism has drastically changed the work roles in comparison to the ones in the traditional work environment. The new job design limits the responsibility of workers to managers to carry the orders of the managers. They are not allowed to decide what and how to do in any task. Managers, on the other hand, are responsible from scientifically discovering the work standards and best ways for the workers.

Once the work standards and best way is decided, ensuring the worker and job fit is another critical responsibility of managers. While suggesting so, Taylor was also developing one of the critical functions of modern human resource management. Managers could hire and assign workers to previously defined jobs, instead of assigning jobs to available employees, as was the case in the past.

Although Taylor designed a machine like organization structure and treat workers cogs of the machine, he was well aware of the human nature and psychology. The union and management conflicts since the emergence of the factories were the reality of American work environments. Machines could not resist but human beings could find ways to sabotage the system. Therefore, the development of a cooperative work environment, as the responsibility of management and managers was at stake in Taylorism.

Taylor thought that an important mean to achieve this goal was increasing the wealth of the workers and shareholders at the same time. Taylor's motto was a fair day's pay for a fair day's work. He aimed to establish a balance between the effort and the reward. Taylorism required a higher amount of work and pay more than that of a traditional company. As Taylor's workers create more value through the principles of science, they earn more money. Taylor's conversation with worker Schmidt is a good example of this exchange (Taylor, 2007, sf.28-29). Taylor convinced Schmidt to earn about 60 percent more salary in exchange of carrying 47 to 48 tons of pig iron instead of 12, 5 ton. As Schmidt made \$1, 85 a day instead of \$1, 15, the productivity increased about 400 percent. However, the result was not just related to the hard work of Schmidt but the science of carrying pig iron.

### **2.3. Taylorism as a Management System**

Taylor strongly argues that the success of its approach depends on whether an organization adopts it as a system or not. Therefore, he is against the use of some techniques or elements of his system.

Taylorism involves five components such as systemization of production process, systemization of tools, standardization of work, wage incentive system, and functional foremanship (Thompkins, 2005).

- Systemization of the production process: An important success of Taylorism is the continuous flow of work in and in between departments without any halt in the production system. As a result, workers, machines, supplies, and departments are reorganized and closely controlled by managers to ensure timely and efficient production process.
- Systemization of tools: According to the Taylor, right amounts and quality of tools must be available to machinists at the right time. It's also important to note that a standard work requires standardized tools.
- Standardization of work: As seen in the worker Schmidt example, productivity is critically related with how workers do a task. This is the essence of Taylorism's changing roles between workers and management. Managers with the help of researchers must find the best way for any task and make sure that the task for any job is done accordingly, therefore; the communications and close control of the worker were critical for the implementation.
- Wage incentive system: Taylor is well-aware of the psychological and work place related reasons of soldiering to limit the

outputs in factories. He determined a strict wage system to pay fairly in return to the increases in productivity. The system has three components: setting high standards for any given task; hiring or transferring right people to achieve the standards; and paying them clearly more than traditional workers. As a result, the company must share more of the added value with workers to some extent, as long as they achieve the daily standards.

- **Functional Foremanship:** The tight controls are very critical for the accurate functioning of the Tayloristic system in a production facility. Taylor believed that one foreman could not supervise the very different aspects of the work so that he suggested employing eight foreman to work with the workers. Four of them such as gang boss, speed boss, repair boss, and the inspector are closely monitoring the workers, while others, routing clerk, instruction card clerk, time and cost clerk, and shop disciplinarian, are responsible with the implementation and communications of the production plan (Tompkins, 2005). Tayloristic system is interesting in the sense that the first four supervisors are also monitored.

### 3. Deming's Quality Management system

Relaying on Walter Shewhart's concept of statistical process control (Tompkins, 2005), quality management was developed by an American, W. Edwards Deming in Japan. Deming was born in 1900, when Frederic W. Taylor was about to retire from active factory work life at Bethlehem Steel Corporation where his theory of management matured through notable experiments (Britannica, 2016). Edwards Deming was a mathematician who developed a special interest in statistics. Deming started working with Japanese engineers and manufacturers to improve bad quality Japanese goods. He developed his quality management approach in Japan. Why did an American develop a theory that was applied to Japanese factories? The reason was that Taylorism was dominant in the American industry and there was not any significant demand for a quality system on which Deming was an expert in the USA (Walton, 1998). The uncompleted American dominance in automobile and home appliances in Post-World War II markets was a critical reason for the negligence of quality. At the same time, Japan had lost most of its industry with very poor economic and social conditions and was very motivated to rebuild a new one. Deming was aware of the limits of statistical control for quality, therefore; he proposed his 14 principles to reorganize management along with seven deadly diseases to avoid.

### 3.1. Deming's Fourteen Points and Seven Disease

Deming's fourteen points that reorganizes management are as follows (Deming, 2014):

- Create a unity of purpose for improving products and services: Deming called companies to have a long term focus which was not the case for many (Deming, 2014). The long term focus should be specifically on innovation, research and education, continuous improvement of products and services, and maintenance of equipment, machinery, and furniture (Walton, 1998).
- Adopt the new philosophy: With the new philosophy, Deming directs the attention of business leaders to Japanese management style based on quality (2014). New standards, reliable and smooth operations that eliminate mistakes and deal with defects, poor workmanship, bad materials, poor training and uninformed as well as fearful workers are needed (Walton, 1998).
- Stop relying on control for achieving quality: Deming argues that quality cannot be achieved by routine control of products but by improving the production processes (2014). According to him 100% control of products mean that a company admits the bad quality of production processes and produced products. Mass control is ineffective, expensive, and unimproved processes (Walton, 1998).
- Increase quality instead of awarding business on price tag: According to Deming, price does not mean much without a measure of quality in purchasing supplies (Walton, 1998). Such an approach decreases the quality of inputs and increases the cost of production (Deming, 2014).
- Improve production and service system for increasing quality and productivity thus lowering costs: Quality must be incorporated into the planning and design of production process (Deming, 2014). Improvement of the production and service systems should be continuous. But it is not just limited to the manufacturing and service delivery but also to purchasing, transportation, engineering, maintenance, sales, personnel, training, and accounting (Walton, 1998).
- Institute on job training: Training must be restructured from the scratch. From the inputs to the delivery of goods to the customers, workers must know about the company (Deming, 2014). Workers must not be left to the training of other workers, left alone with the machines, or rely on unintelligible written instructions (Walton, 1998).
- Institute Leadership: The focus of the management should be

leading not controlling. Instead of the control of the production targets, leadership must be instituted (Deming, 2014). To do so, management must remove the barriers to get a worker to be proud of his job and get better know about the work done in the processes rather than counting the outcomes (Walton, 1998).

- Remove fear so that people can work effectively for the company: Deming argues that modern employee are too submissive in the sense that they hesitate to put input into the system, since they are afraid of possible negative results. This results in a lack of or significantly reduced problem solving capacity (Walton, 1998). If fear to make mistakes can be eliminated, workers can contribute to the quality and productivity.
- Create teams of people from different areas by tearing down departmental barriers: Deming points out an important problem of traditional organizations, the coordination of different functions or departments. If departments are let alone, each department attempts to achieve its best while the other cannot keep up with it. As the marketing department can have many orders, the manufacturing department may not have sufficient capacity to reply (Walton, 1998).
- Eliminate slogans, advices, and targets for increasing productivity which depends on the system: Deming suggests that any kind of slogans, warning signs or targets are counterproductive. Instead of warning people about an oil leak, do not let oil leak! Without a proper system in place from raw materials to proper functioning machinery, the slogans and targets are empty arguments that do not change anything (Walton, 1998).
- Replace numerical quotes and management by objectives with leadership: Deming argues that quotes result in low morale, low quality and game playing by the workers and managers. When people reach their quotes, they can stop working. Ones that do not reach it loose their motivation. Managers can hide the overquote production for the rainy days (Walton, 1998). The most important thing is encouraging employees to contribute avoiding waste and increase productivity through enhanced feeling of loyalty and pride (Walton, 1998).
- Remove barriers to pride for workers, managers, and engineers: Workers are pretty much aware of the importance of the acceptance by the market place (Walton, 1998). They know about the problems going on in many aspects of the production processes. But they feel left alone with problems with insufficient attention of managers. While relations with workers are not nurtured, the



targets without concern for quality are the main focus of the managers. This result in a commodity like treatment of workers (Walton, 1998).

- Institute a vigorous program of education and development: Hiring right employees not sufficient. Employees need to acquire new knowledge and new skills to deal with the new materials and new methods of production (Walton, 1998). According to Deming, this critical for ensuring the success of long-term planning.
- Have commitment of everybody at the company for achieving the transformation: Deming expects the action from the top management for the implementation of the previous thirteen principles through adoption of new philosophy, seminars and challenge against the traditional ways of management (Deming, 2014). He proposes the *Shewhart Circle* that includes planning, doing, checking, and acting phases (Walton, 1998). Planning involves deciding on what changes to make; doing means a small scale application; checking relates to evaluation of the small scale application, and; acting means introducing a large scale application of positively tested change plan in the organization.

Along with the 14 essential points, Deming also provided a list of seven deadly diseases that inhibit quality, increase costs and thus decrease the productivity. This seven deadly diseases are as follows: lack of consistency of purpose; emphasis on short term profits, evaluation of performance, merit rating, or annual review of performance; running a company on visible figures alone; excessive medical costs, and excessive costs of warranty (Walton, 1998). These principles are closely related with a lack of planning and long term focus, negative effects of performance measurement, focus on numbers rather than quality, increasing cost due to employee health problems and bad quality products.

#### **4. THE SIMILARITIES AND DIFFERENCES BETWEEN TAYLORISM AND QUALITY MANAGEMENT**

The below comparisons are in regard of the Tayloristic system explained earlier in the paper. Moreover it is also important to remind that the comparisons are based on the writings of both theorists not the factory practices.

##### **4.1. Systemization of Production Process**

Taylor and Deming developed their approaches principally for a factory production system. They asked practitioners to use the whole system not a part of it. Deming was concerned with an effectively work-



ing system that could produce quality in each aspect of the industry value chain from raw materials to the delivery of products to the customer. Although standardized outputs were crucial for Taylor, quality was not his priority in Deming's sense. Taylor's focus was on effectiveness, efficiency, and productivity. Deming thought that the focus on efficiency ended up with low quality products and services as well as increased costs. If the focus was quality, efficiency and productivity would follow.

Taylor and Deming stated the importance of flow of work between departments. However, it is critical to note that Deming's quality system also integrated customers and suppliers into the system since quality could not be achieved without their feedbacks.

#### **4.2. Systemization of Tools**

Taylor insists on the well-functioning tools that are available in required quantity and quality at the right place. Without an order in the equipment used, the production process cannot continuously and efficiently work because of halts. Deming also give importance to the equipment, tools and machinery to be used. His quality approach involves a good maintenance and upgrade of tools, equipment and machinery to avoid defective products and halts in the production system.

#### **4.3. Standardization of Work**

Standardization of tasks through finding the best ways is one of the most critical aspects of Taylorism. Every aspects of any task is analyzed by the researchers. Once adopted, they are implemented by supervisors. However, these standards have a short term focus that includes steps to achieve previously determined quotes and targets. Deming has a different approach; he focuses on the quality standards with a long term focus. Moreover, these standards are determined by teams of workers. As a result, Deming twists the roles played by the managers and workers in determination of the standards. Moreover, for Deming, craftsmanship is critical. Employees' work definitions are not very narrowly defined to create meaningful jobs to increase job satisfaction.

#### **4.4. Wage Incentive System**

Taylorism introduces a piece pay rate system based on the clearly defined quotes, numerical standards for the production of standard products. If an employee has a slight variation from his target, his daily pay is significantly decreased. The rationale of the system is based on working with the right person. If a person cannot reach his targets, he

will be economically forced to switch to another job. Deming is totally against such a pay system. Actually, he is against the individual performance measurement. It is one of the important reasons for bad quality and inefficiency. Deming focuses on rewarding the team performance. The rewards for the employee performance depends on the contribution of a team's to quality such as decreasing cost and eliminating waste as well as increasing customer satisfaction. An essential point in his approach is also his pressure on employee pride. Therefore, the intrinsic rewards are also critical in the quality approach.

#### **4.5. Functional Foremanship**

The functional foremanship is a key to Taylorism. Taylor insisted on an elaborated control system in which workers supervised by eight different foremen. Actually in this system, foremen controlling the workers are under the control of other foremen. Deming is totally against the close supervision that creates fear and tight controls. Deming's focus is on people's pride. Instead, Deming relies on statistical process controls to continuously improve the work processes through the inputs from workers. The important point here is that the workers are not just input providers but also the change agents that determine the new quality standards to be employed.

### **5. CONCLUSION**

Modern Management theory and its practices has been developing since the rise of factories in the Western World. Taylorism is the first modern management theory that have affected many other theories developed in the last 100 years. Deming's quality approach has certainly some points involved from Taylorism. However, the philosophy or the doctrine of the quality approach based on Deming's writings are critically different from Taylorism.

Quality management is democratic and empowers employees to make decisions. However, this is not the only difference. The spirit and the culture of both systems are critically different. The organization culture guru Edgar Schein (2010) states that the hidden values underline the behaviors and the performance of organizations. As maximization of the efficiency is the central value in Taylorism, quality is the overarching value that manage the system in Deming's quality management approach.

Productivity and planning is critical components of Taylor's system. Deming does not reject the importance of the productivity, however; it is perceived as the result of quality in Deeming's approach. Planning is also for improving quality of which productivity is the result.

As Taylorism focus on an organization's production process and integration of departments, quality approach puts customer needs and the relations with the suppliers at the center for continuous improvement of quality.

Training of the employees are critical for both systems. Training of employees involves teaching the best way step by step in Taylorism, while it means increasing the capacity of workers, not just implementation of quality standards, as well as continuous improvement of quality at organizational level.

Taylorism scientifically and narrowly defines tasks for a job. It does not only excludes employee inputs but treat employees as the cogs of a machine. Employees develop quality standards through quality circles by the help of Stewart Circle, and take charge in the implementation and enforcement process in the Deming's quality approach. Moreover, as quality approach satisfies the higher order needs of employees such socialization, self-respect and self -actualization, Taylorism has no intention of doing that.

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